FIG. 1

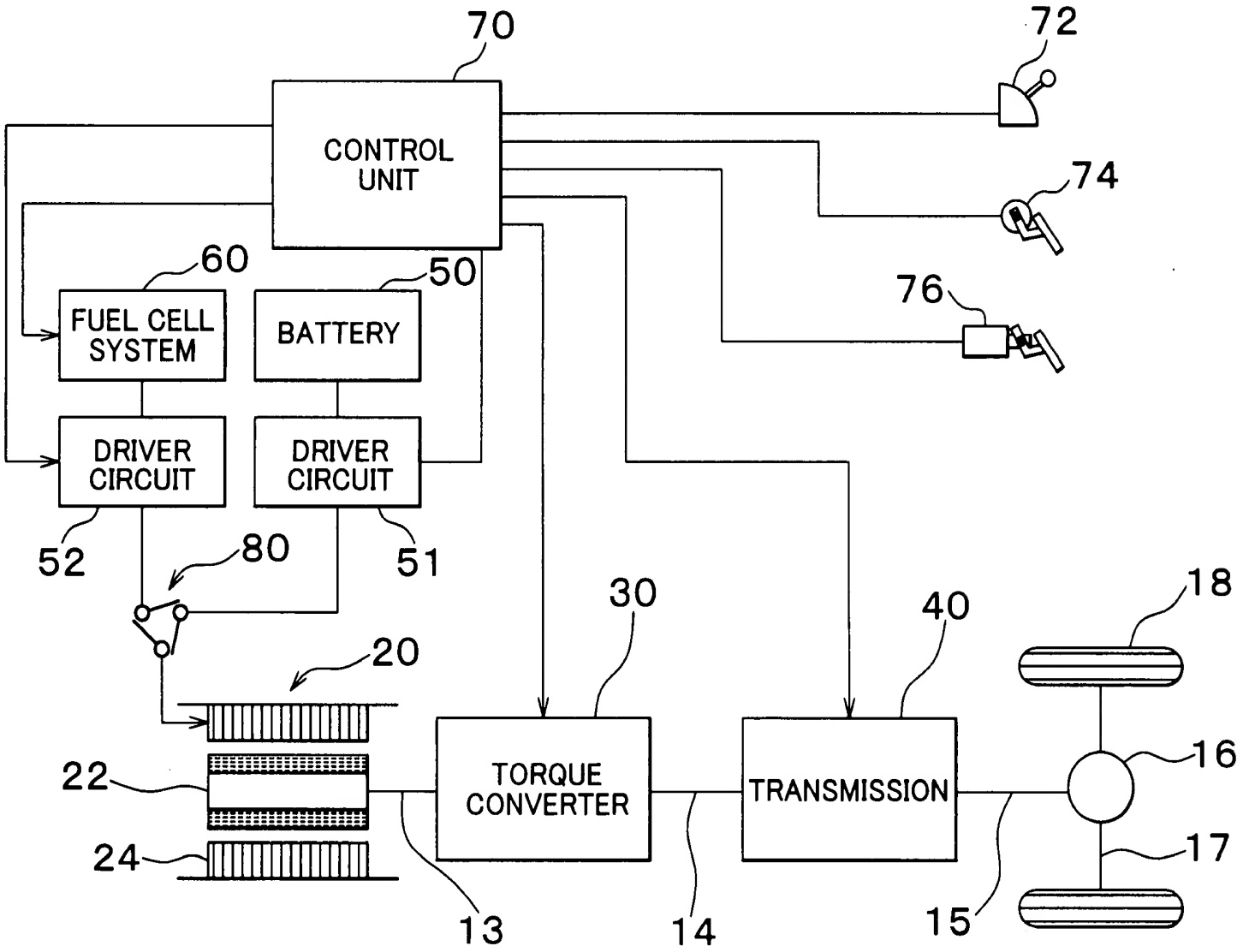

FIG. 2A

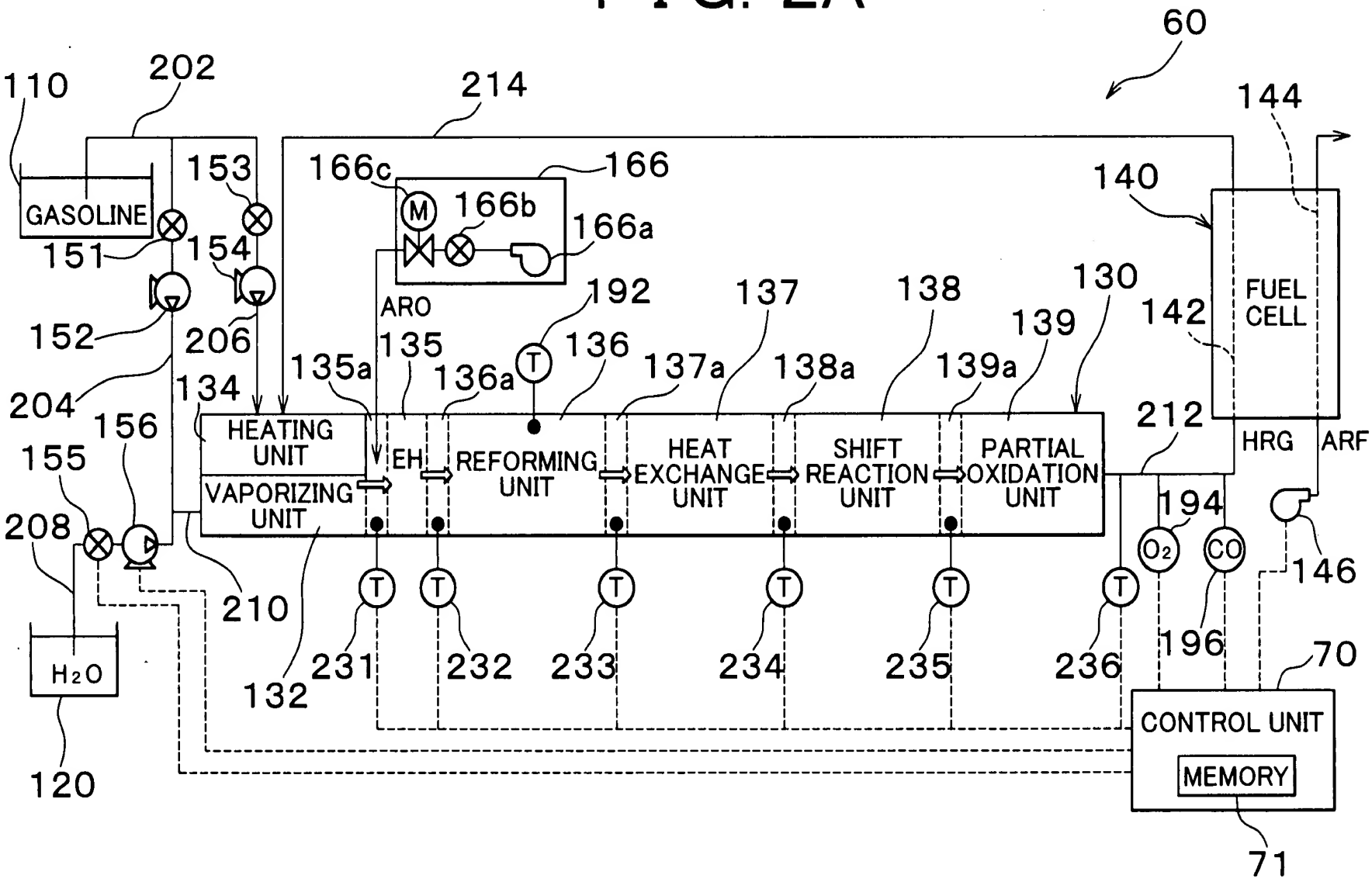
60
110
202
214
144
153
166c
166
140
GASOLINE
151
154
166b
166a
152
206
ARO
192
137
138
130
142
FUEL CELL
204
135
136
139
135a
136a
137a
138a
139a
134
212
156
HEATING UNIT
EH
REFORMING UNIT
HEAT EXCHANGE UNIT
SHIFT REACTION UNIT
PARTIAL OXIDATION UNIT
HRG
ARF
155
VAPORIZING UNIT
194
208
O2
CO
146
210
231
232
233
234
235
236
196
70
H2O
132
CONTROL UNIT
MEMORY
120
71

FIG. 3A

CARBON REMOVAL MODE OPERATION
(FIRST EXAMPLE)

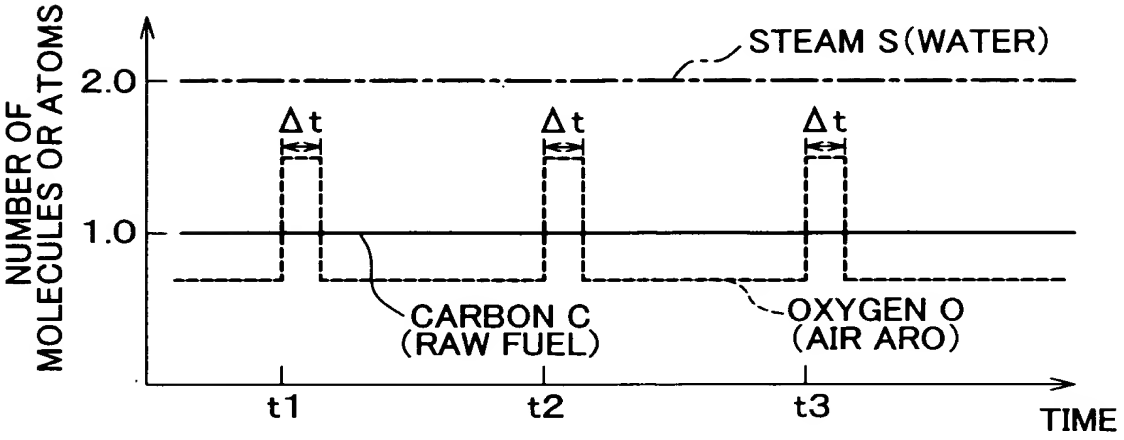

FIG. 3B

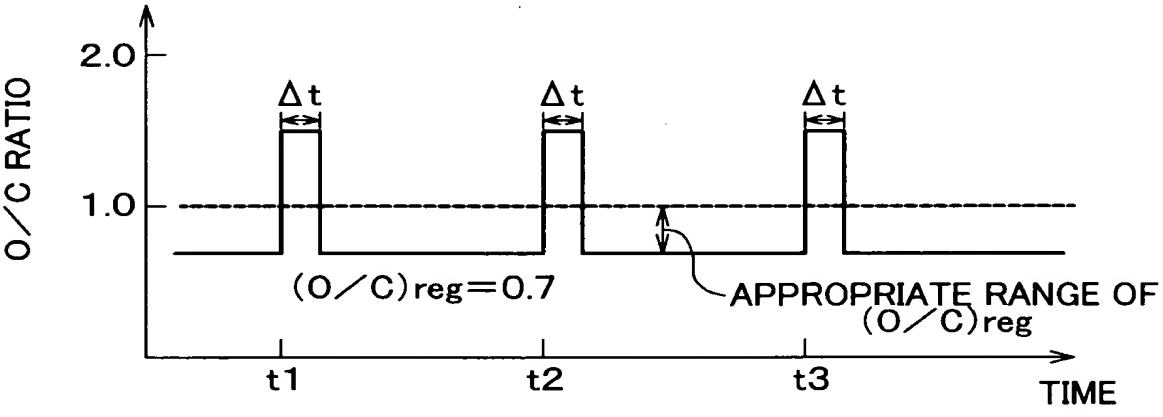

FIG. 3C

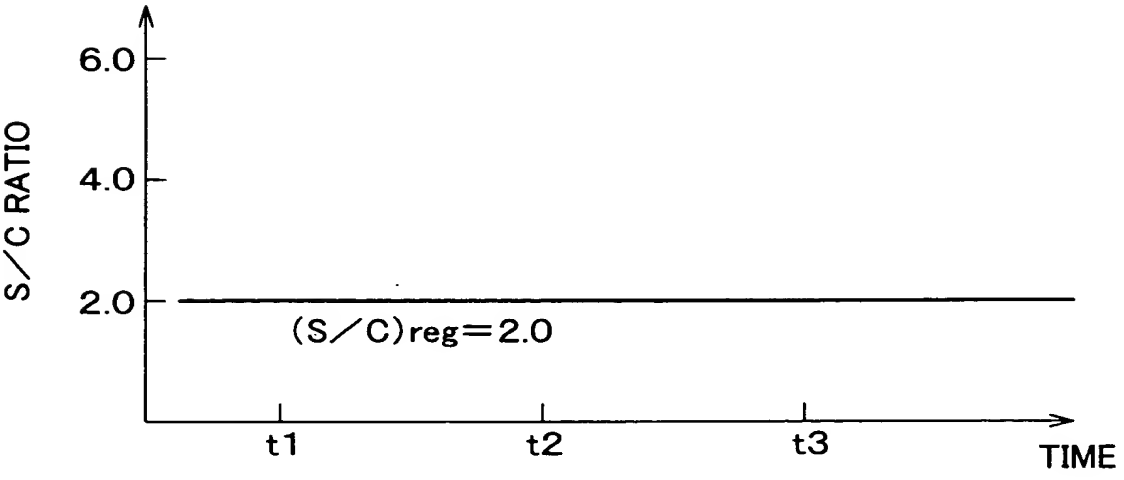

FIG. 4

RELATIONSHIP BETWEEN CARBON REMOVAL PERIOD Δt AND O/C RATIO

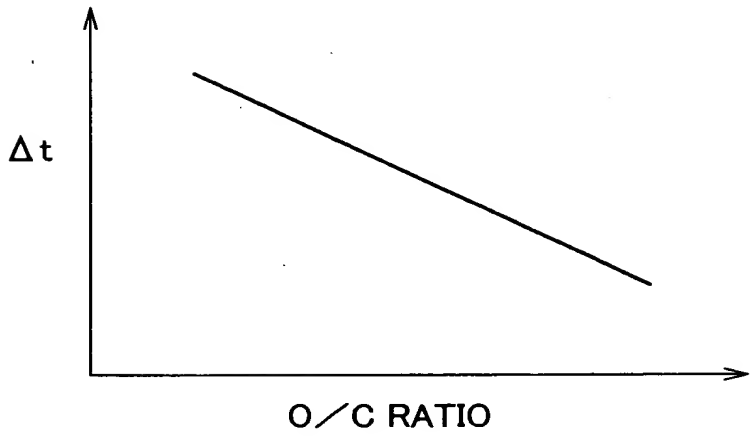

FIG. 5

RELATIONSHIP BETWEEN CATALYST TEMPERATURE Tcat AND O/C RATIO

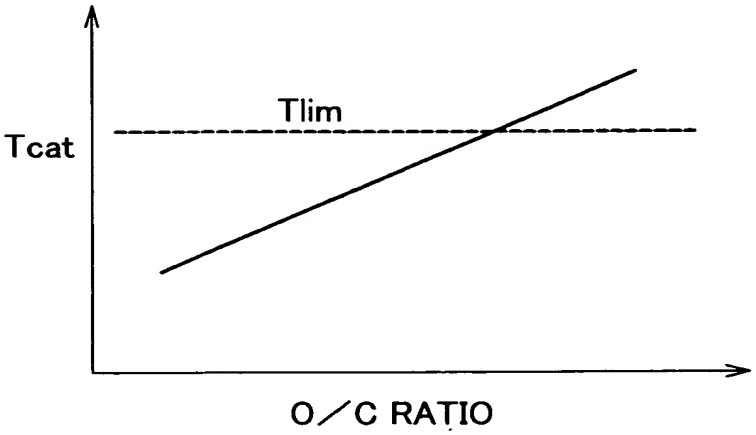

FIG. 6

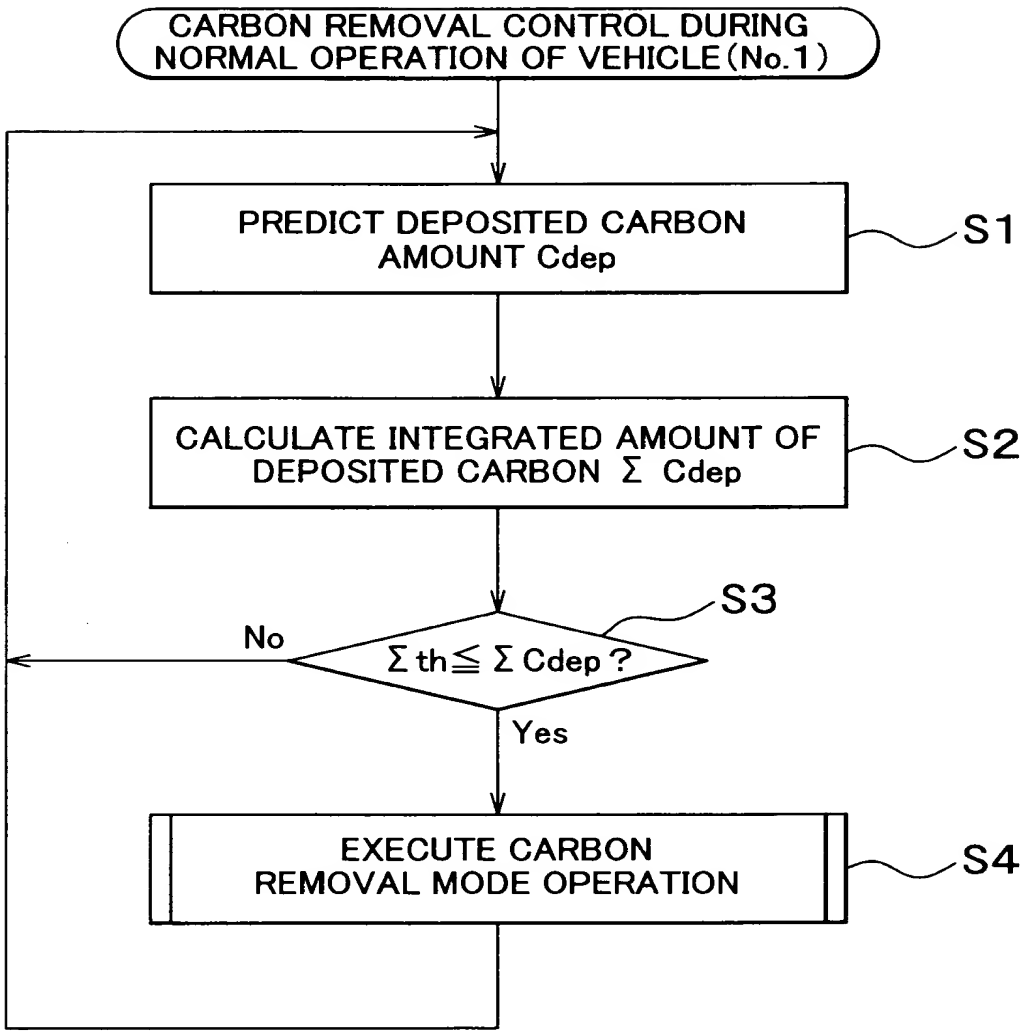
CARBON REMOVAL CONTROL DURING NORMAL OPERATION OF VEHICLE (No.1)
PREDICT DEPOSITED CARBON AMOUNT Cdep
S1
CALCULATE INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
S2
S3
No
Σ th≦ Σ Cdep ?
Yes
EXECUTE CARBON REMOVAL MODE OPERATION
S4

FIG. 7

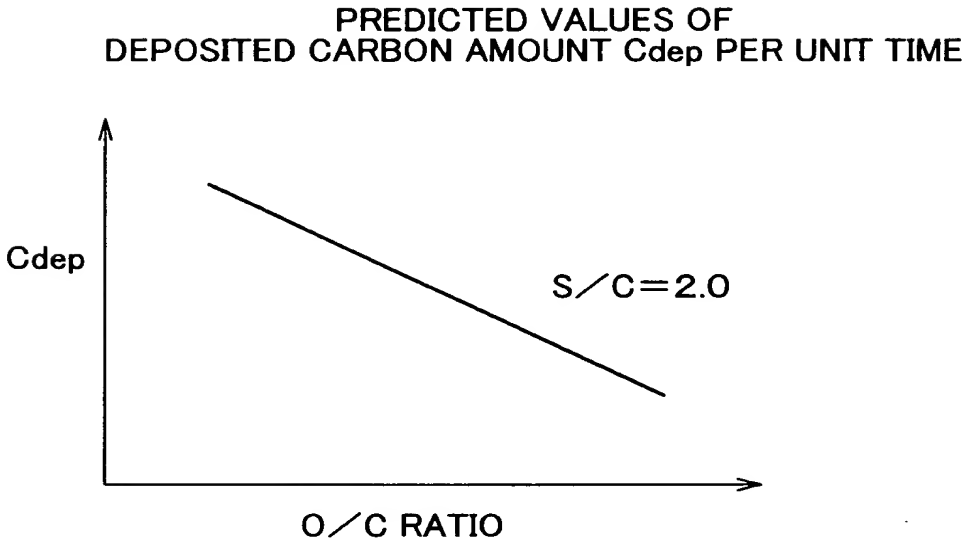
PREDICTED VALUES OF
DEPOSITED CARBON AMOUNT Cdep PER UNIT TIME
Cdep
S/C=2.0
O/C RATIO

FIG. 8

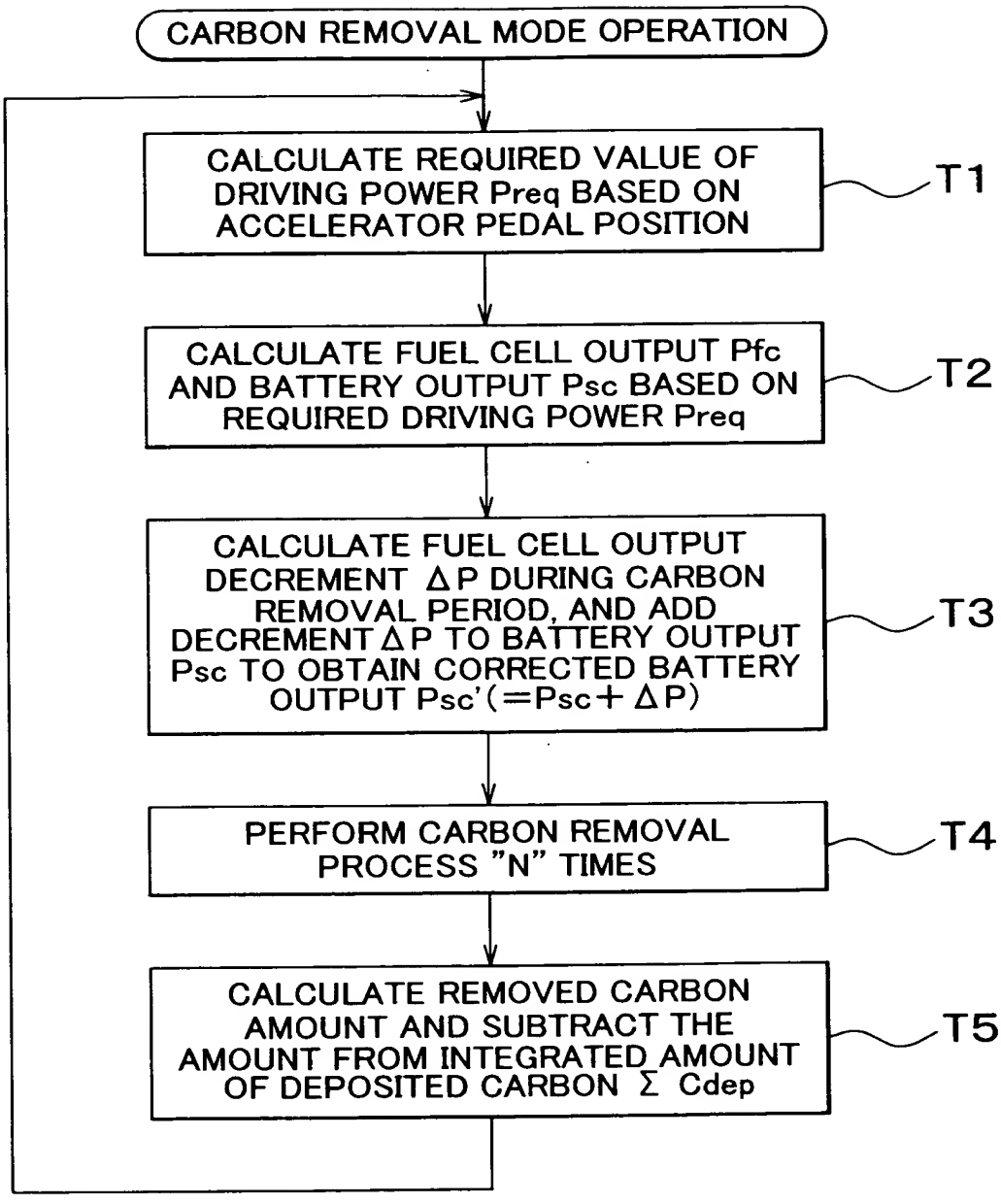
CARBON REMOVAL MODE OPERATION
CALCULATE REQUIRED VALUE OF DRIVING POWER Preq BASED ON ACCELERATOR PEDAL POSITION
T1
CALCULATE FUEL CELL OUTPUT Pfc AND BATTERY OUTPUT Psc BASED ON REQUIRED DRIVING POWER Preq
T2
CALCULATE FUEL CELL OUTPUT DECREMENT ΔP DURING CARBON REMOVAL PERIOD, AND ADD DECREMENT ΔP TO BATTERY OUTPUT Psc TO OBTAIN CORRECTED BATTERY OUTPUT Psc'(=Psc+ΔP)
T3
PERFORM CARBON REMOVAL PROCESS "N" TIMES
T4
CALCULATE REMOVED CARBON AMOUNT AND SUBTRACT THE AMOUNT FROM INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
T5

FIG. 9

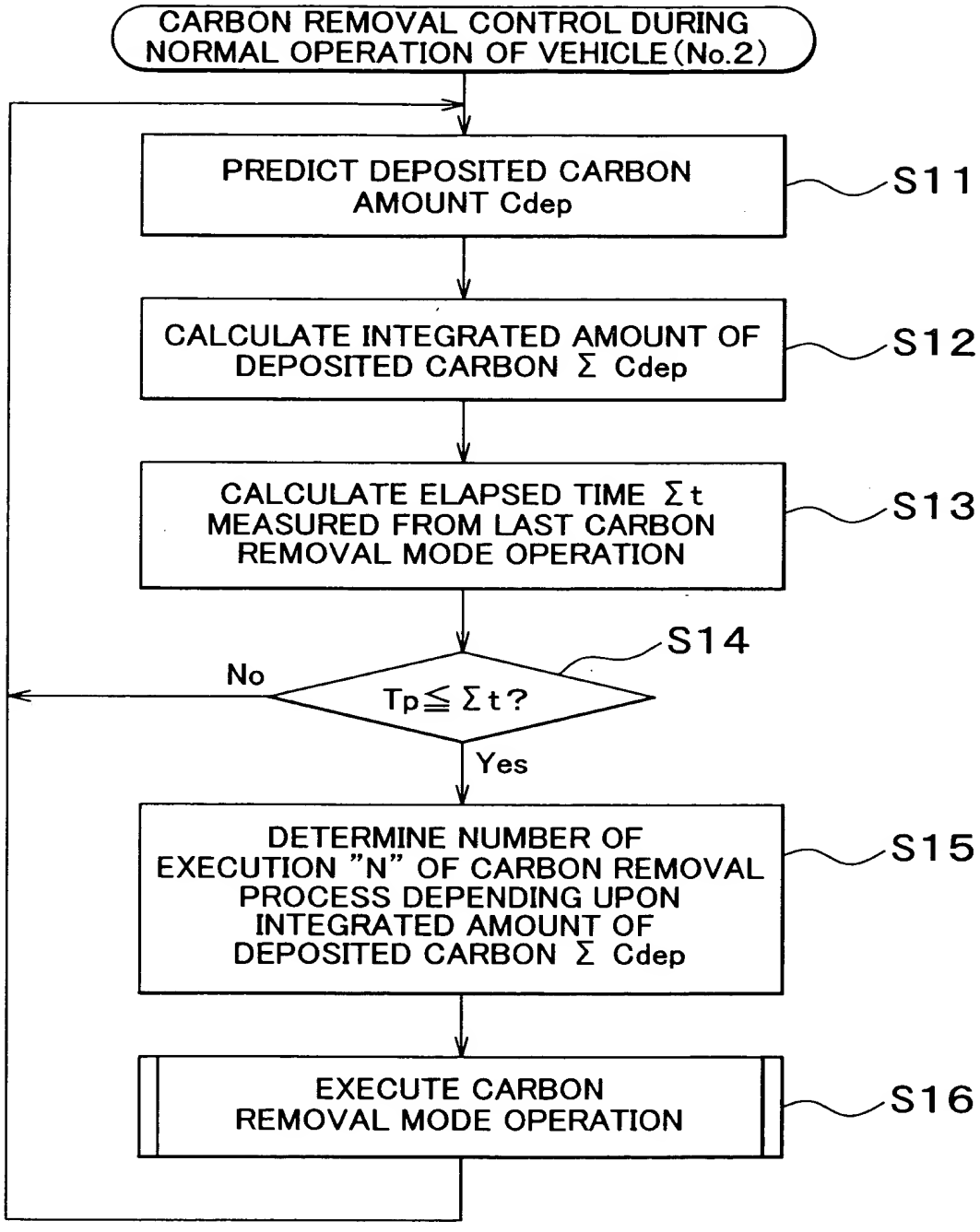
CARBON REMOVAL CONTROL DURING NORMAL OPERATION OF VEHICLE (No.2)
PREDICT DEPOSITED CARBON AMOUNT Cdep
S11
CALCULATE INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
S12
CALCULATE ELAPSED TIME Σt MEASURED FROM LAST CARBON REMOVAL MODE OPERATION
S13
S14
No
Tp≦Σt?
Yes
DETERMINE NUMBER OF EXECUTION "N" OF CARBON REMOVAL PROCESS DEPENDING UPON INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
S15
EXECUTE CARBON REMOVAL MODE OPERATION
S16

FIG. 10

INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
AND NUMBER OF EXECUTION "N" OF CARBON REMOVAL PROCESS

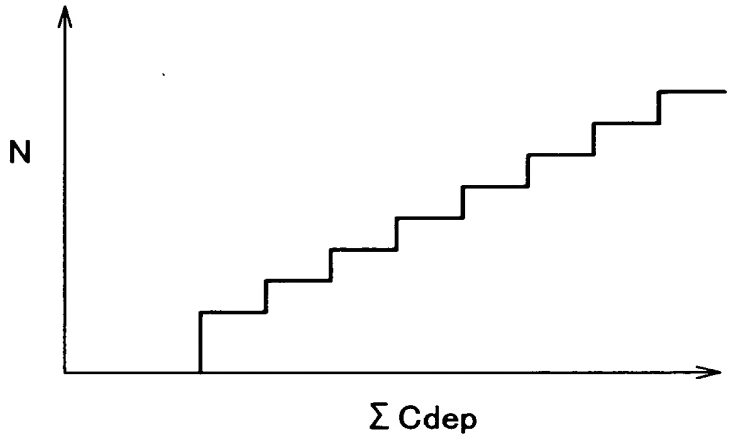

FIG. 11A

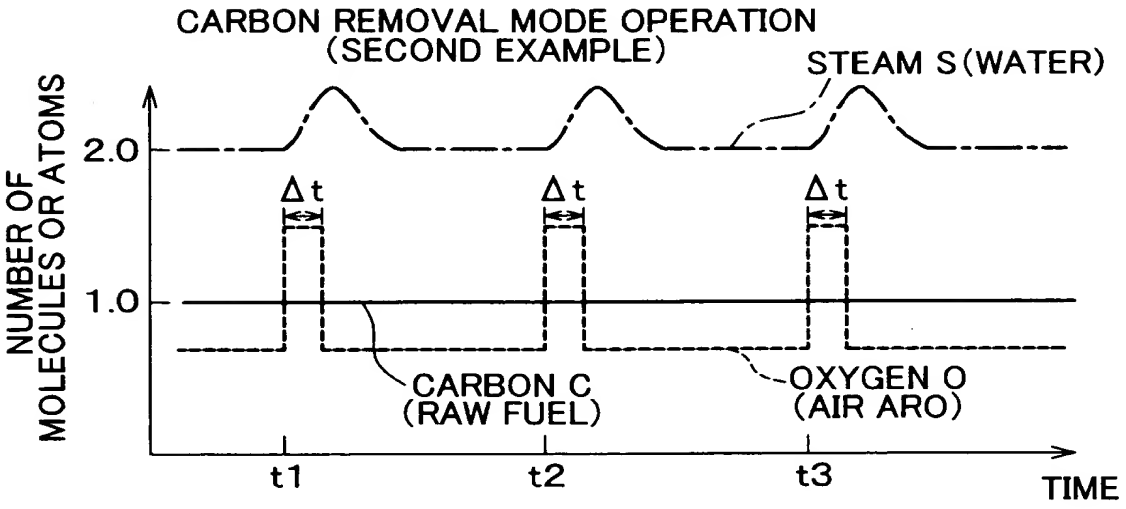

FIG. 11B

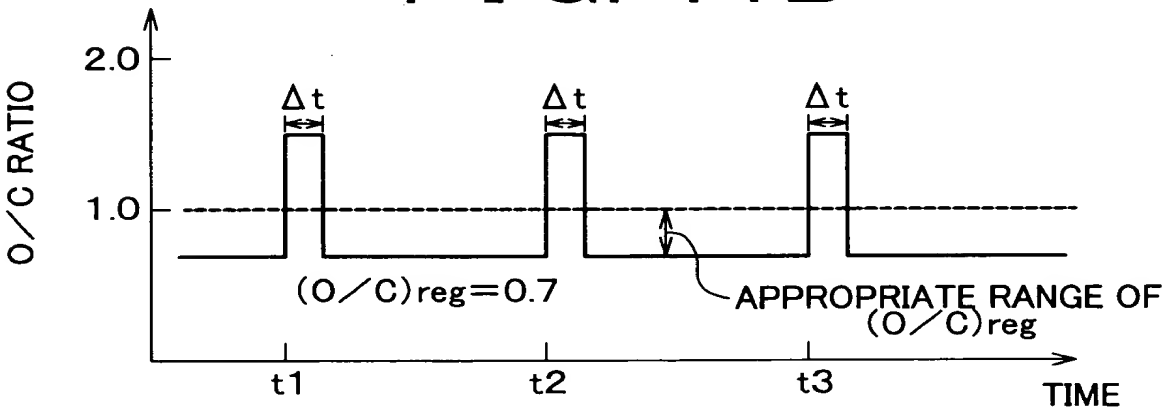

FIG. 11C

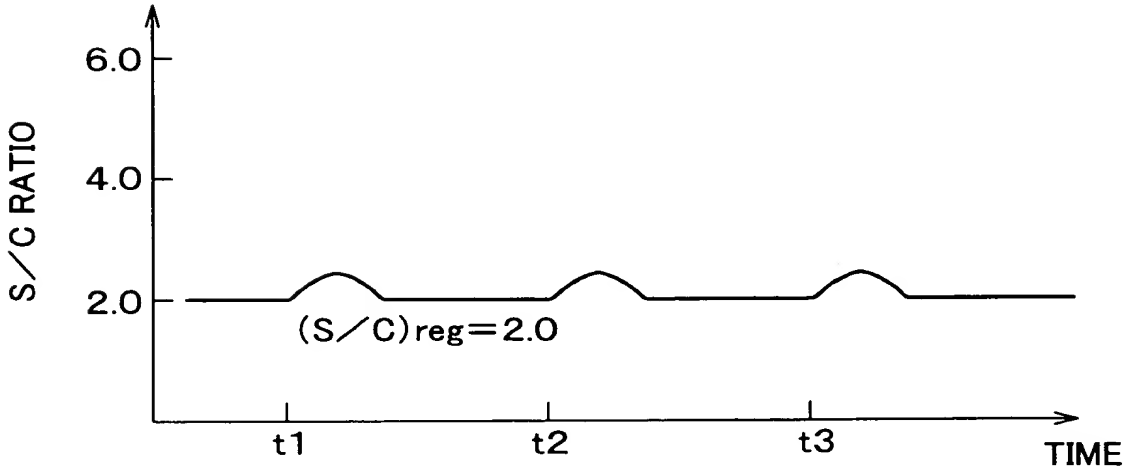

FIG. 12A

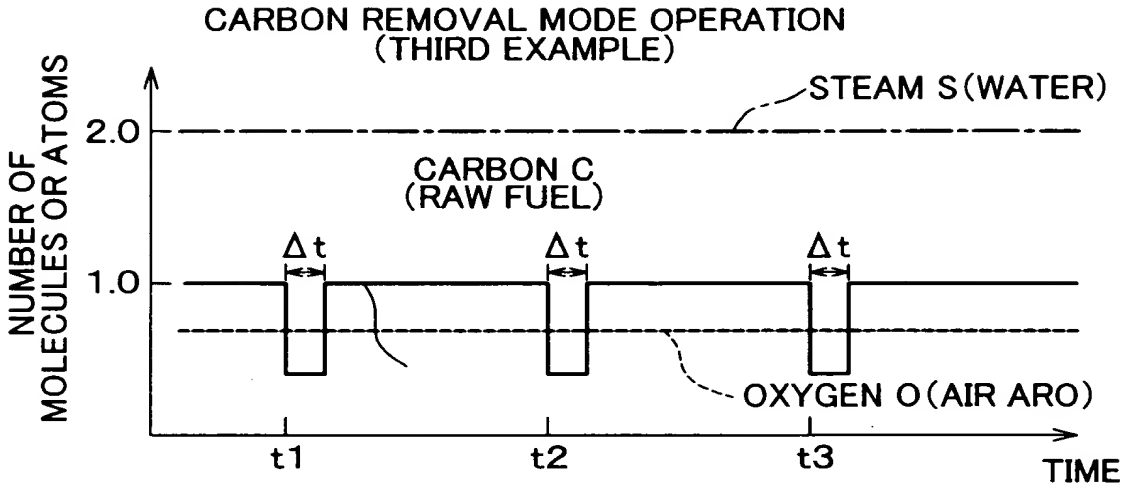

FIG. 12B

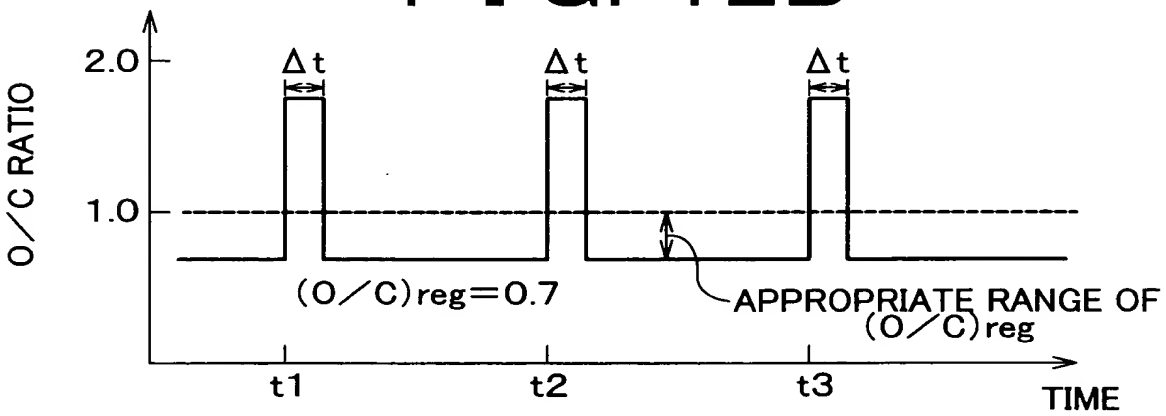

FIG. 12C

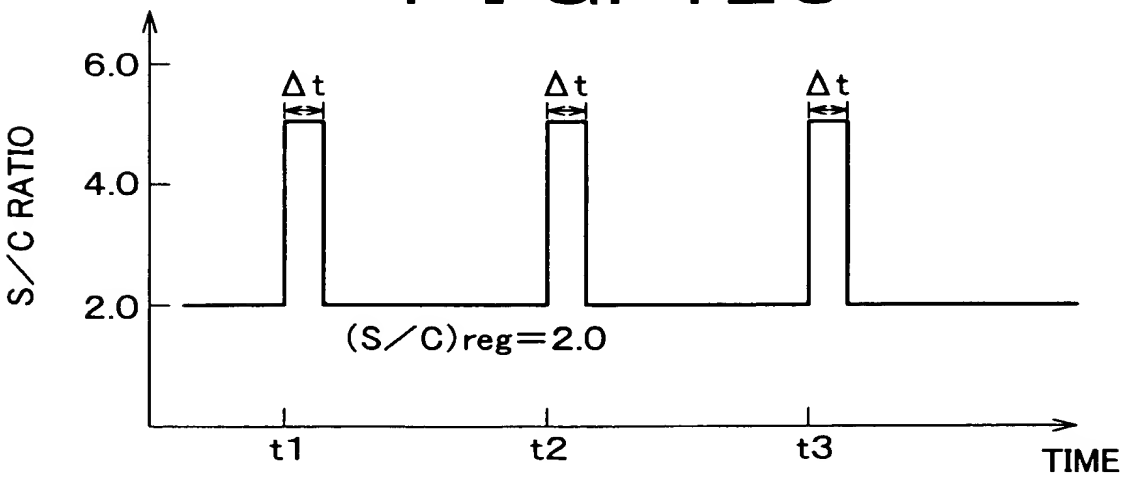

FIG. 13

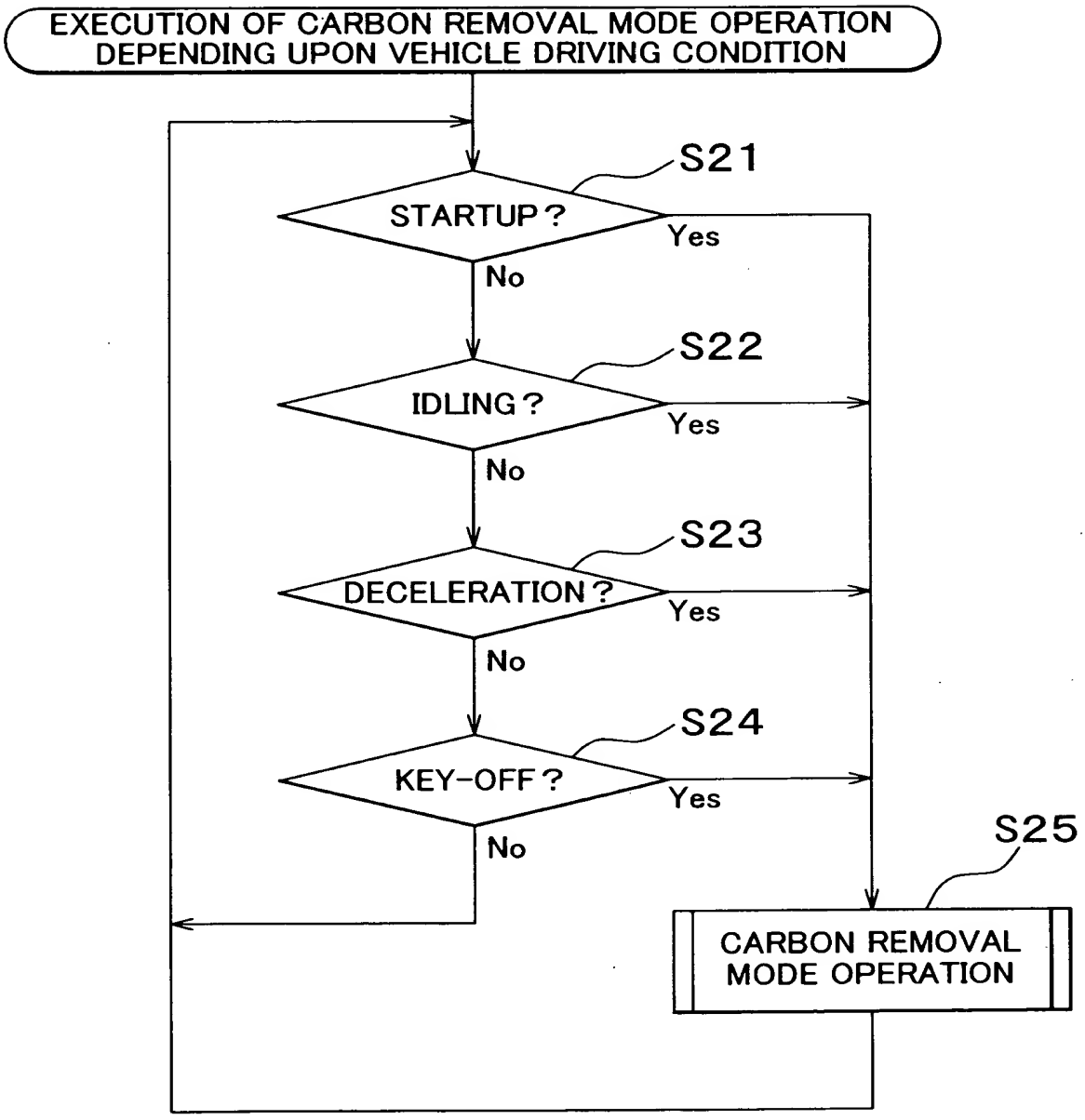
EXECUTION OF CARBON REMOVAL MODE OPERATION DEPENDING UPON VEHICLE DRIVING CONDITION
S21
STARTUP?
Yes
No
S22
IDLING?
Yes
No
S23
DECELERATION?
Yes
No
S24
KEY-OFF?
Yes
No
S25
CARBON REMOVAL MODE OPERATION

FIG. 14A

CARBON REMOVAL MODE OPERATION FOR STARTUP CONDITION (FOURTH EXAMPLE)

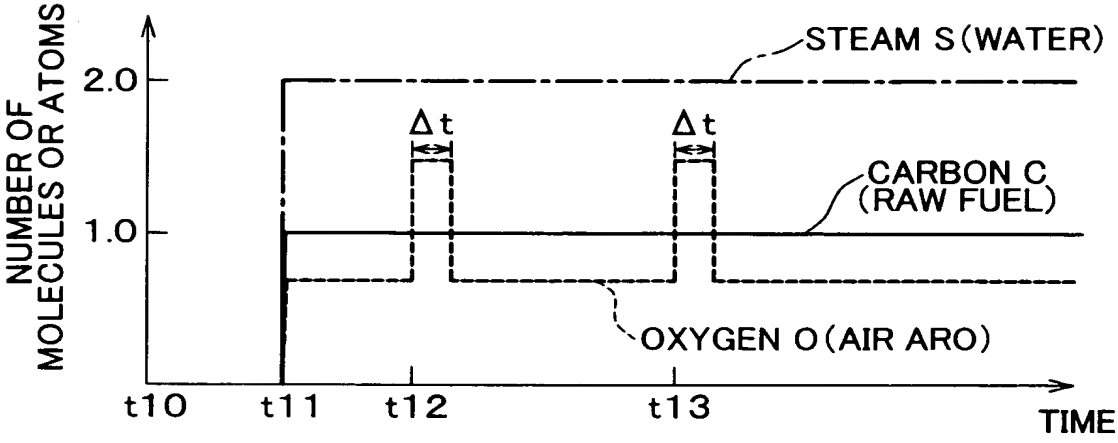

FIG. 14B

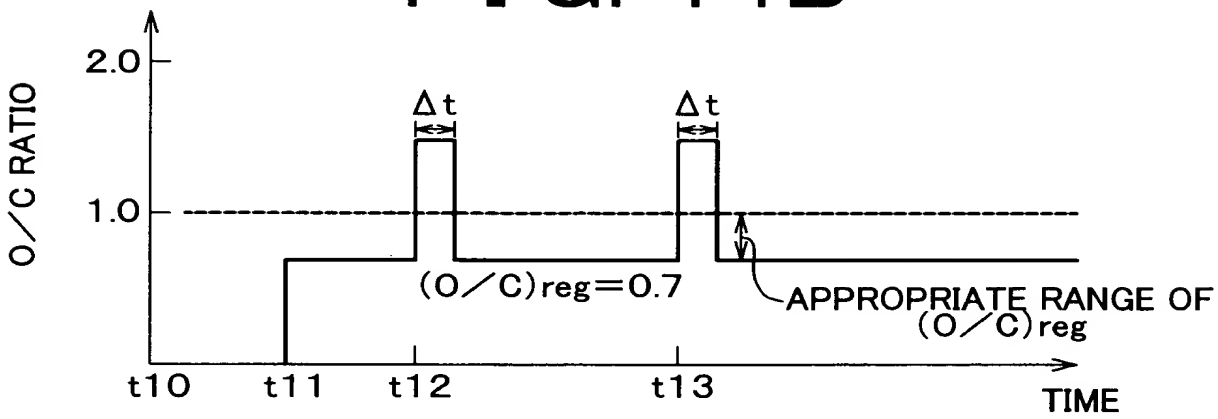

FIG. 14C

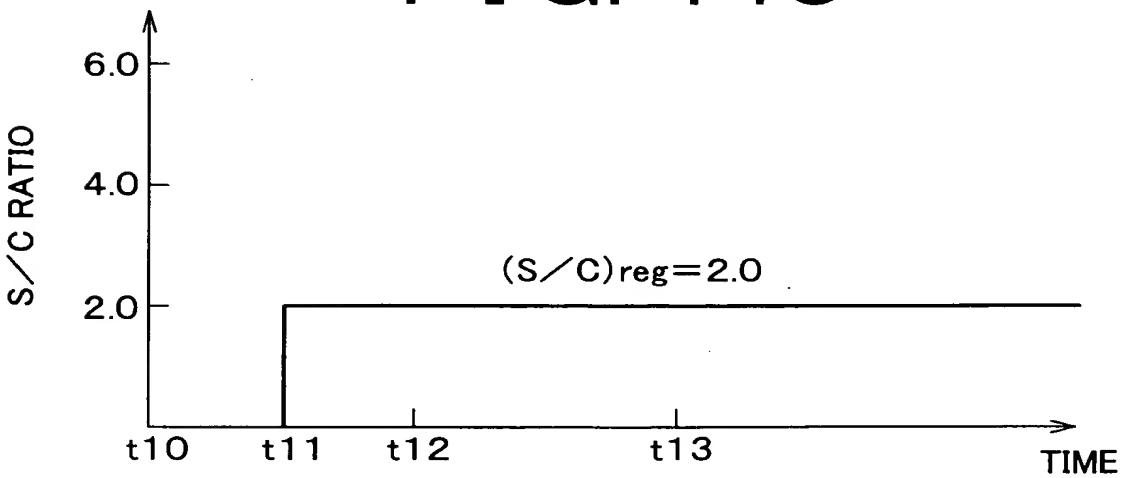

FIG. 15A

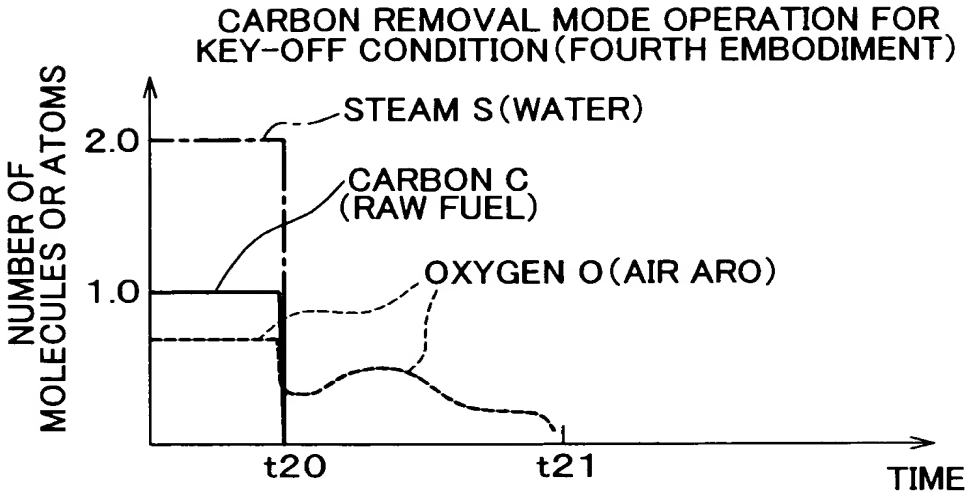

FIG. 15B

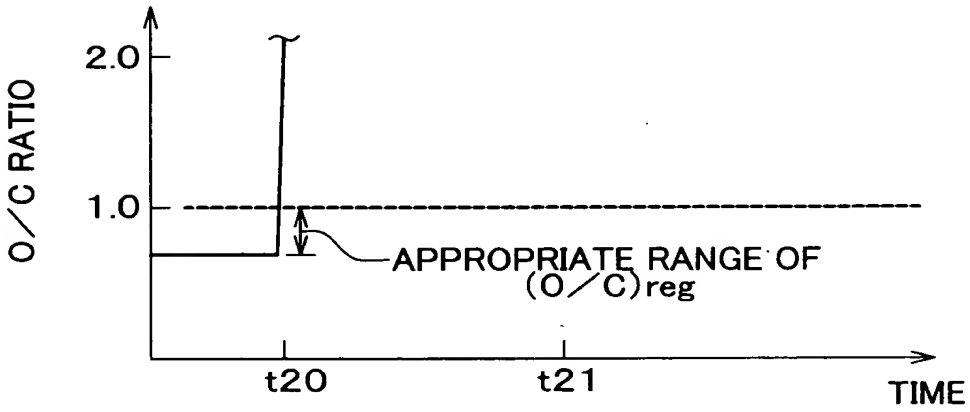

FIG. 15C

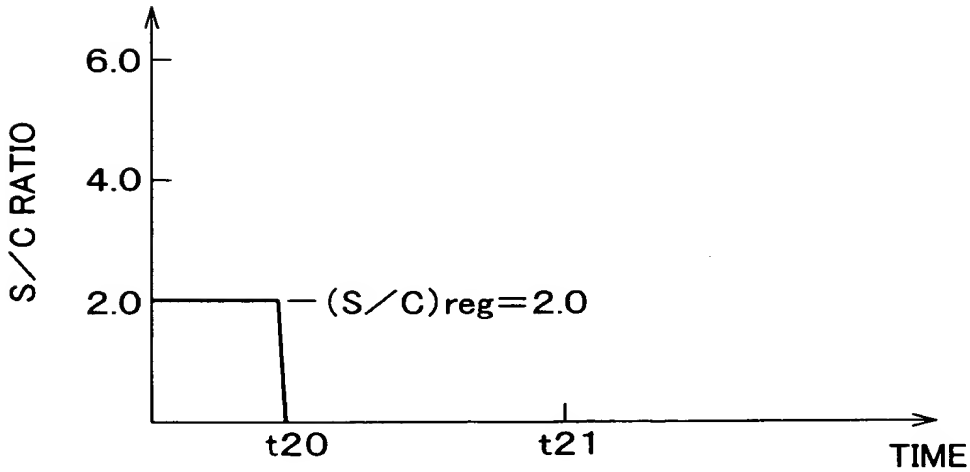

FIG. 16

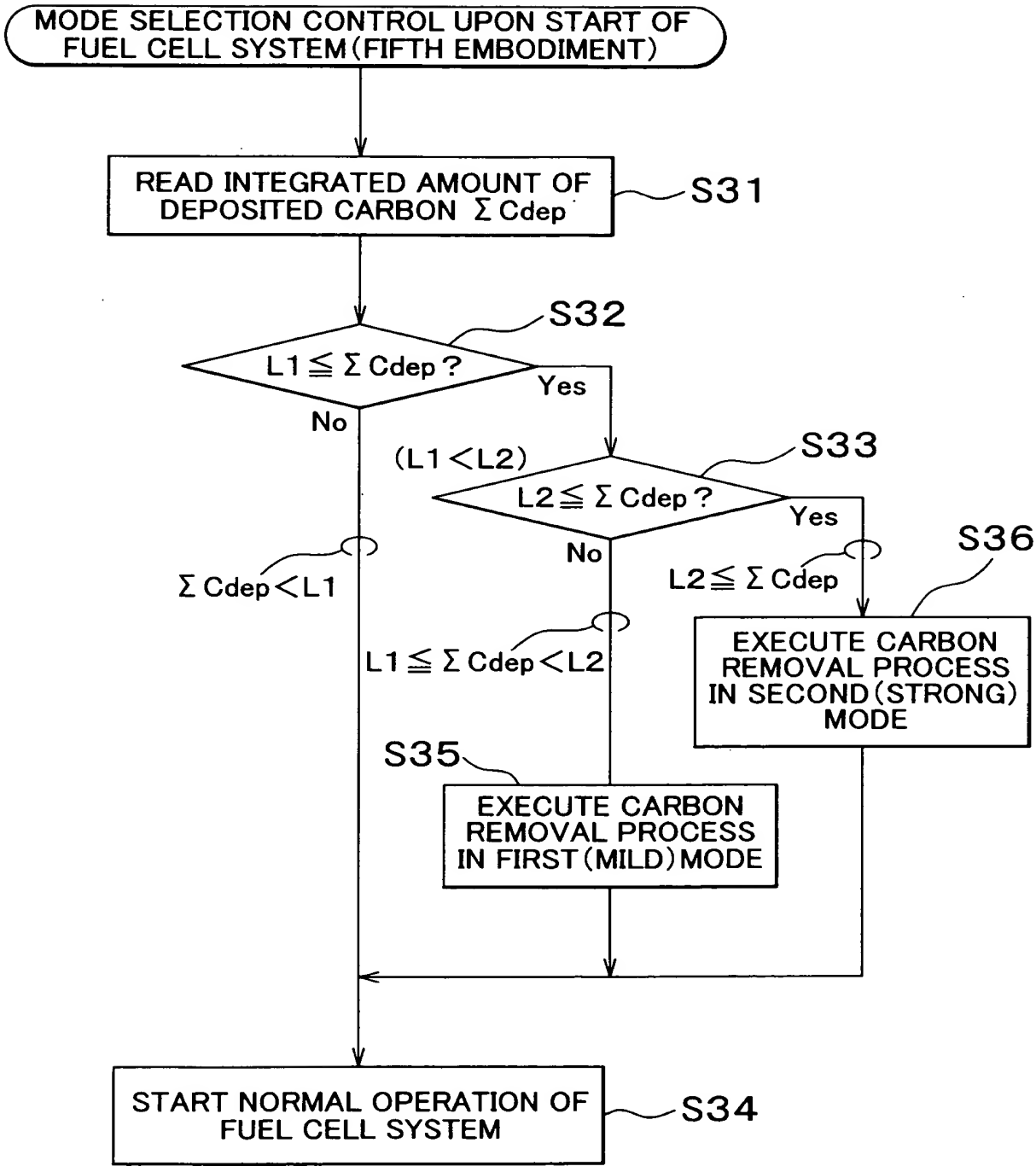
MODE SELECTION CONTROL UPON START OF FUEL CELL SYSTEM (FIFTH EMBODIMENT)
READ INTEGRATED AMOUNT OF DEPOSITED CARBON Σ Cdep
S31
S32
L1 ≦ Σ Cdep ?
Yes
No
(L1 < L2)
S33
L2 ≦ Σ Cdep ?
Yes
No
Σ Cdep < L1
L2 ≦ Σ Cdep
S36
L1 ≦ Σ Cdep < L2
EXECUTE CARBON REMOVAL PROCESS IN SECOND (STRONG) MODE
S35
EXECUTE CARBON REMOVAL PROCESS IN FIRST (MILD) MODE
START NORMAL OPERATION OF FUEL CELL SYSTEM
S34

FIG. 17A

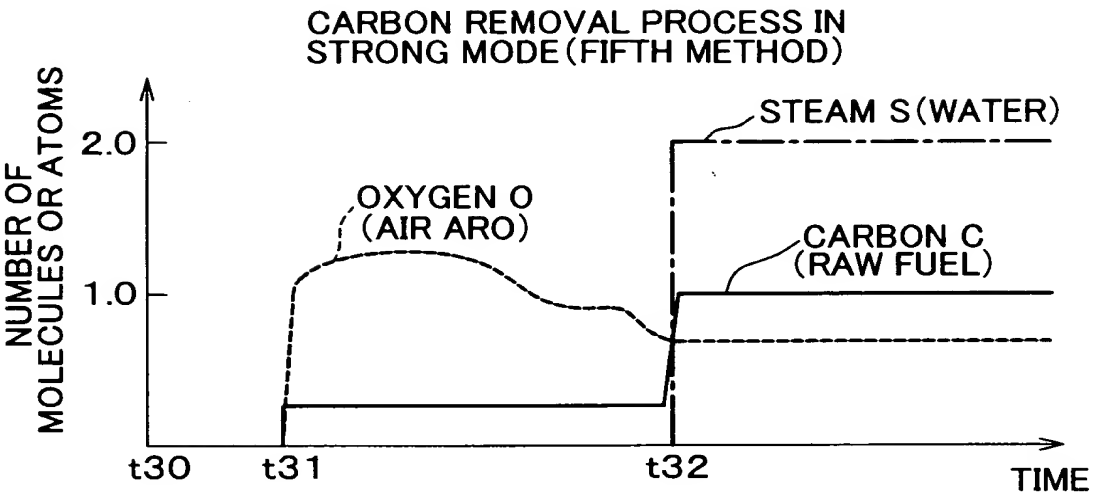

FIG. 17B

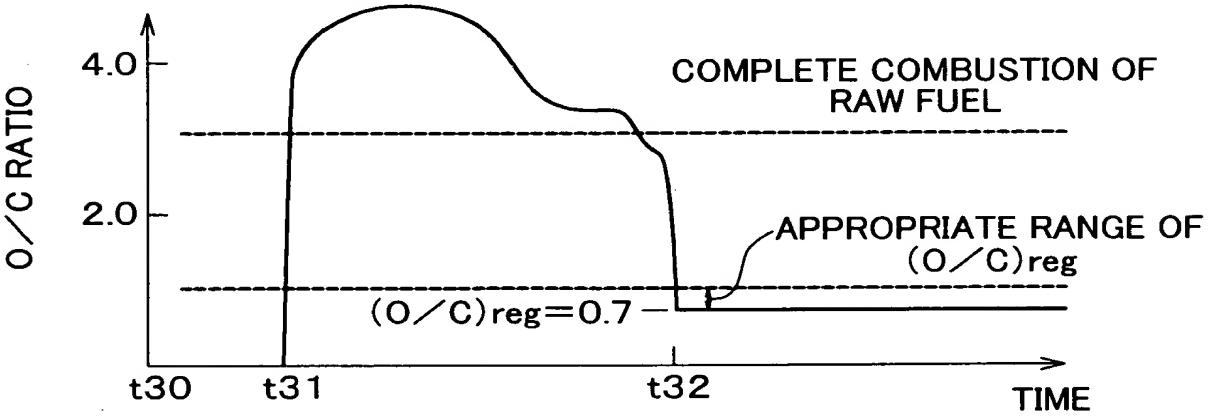

FIG. 17C